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09/850,040	05/07/2001	George E. Carter	01 P8145 US	9560

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EXAMINER	
SINGH, RAMNANDAN P	

ART UNIT	PAPER NUMBER
2646	

DATE MAILED: 02/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/850,040	CARTER ET AL.	
	Examiner	Art Unit	
	Ramnandan Singh	2646	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 October 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,8-18 and 22-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,8-18 and 22-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on Oct. 28, 2004 have been considered but are moot in view of the new ground(s) of rejection.

2. **Status of Claims**

Claim 5 is amended.

New claims 31-32 are added.

Claims 6-7 and 19-21 are withdrawn.

Claims 1-5, 8-18, 22-32 are pending.

Claim Objections

3. Claim 5 is objected to because of the following informalities:

Claim 5 recites the limitation "the second band includes" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claims 2 and 8 are objected because it recites "determining noise is present if the amplitude crosses a threshold" in line 5. As per step 303 of Fig. 6 of the instant application, claim 2 is in error. For the purpose of this Office action, Examiner assumes that "determining noise is present if the amplitude does not cross the threshold". A similar thing holds for claim 8.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-2, 9-11, 25-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Pelaez Ferrigno [US 5,577,161].

Regarding claim 1, Pelaez Ferrigno discloses a computer implemented method (using a digital signal processor) of enhancing sound quality for computer telephony systems shown in Fig. 1, comprising:

receiving digital signals including telephony sounds [Fig. 1; col. 2, lines 61-67; col. 1, lines 16-25; col. 1, lines 61-64; col. 2, lines 12-19];

performing time-to-frequency domain conversion on the digital signals [Fig. 1; col. 2, line 67 to col. 3, line 2; col. 4, lines 57-67; col.8, lines 36-46];

detecting whether noise is present in the frequency domain conversion of the digital signals [Fig. 1; col. 3, lines 2-7]; and

applying a filter to remove the noise if noise was detected in the frequency domain conversion of the digital signals [Fig. 1; col. 3, lines 8-17.; col. 3, line 23 to col. 8, line 35].

Claim 25 is essentially similar to claim 1 except for detecting whether noise is present in the frequency domain conversion of the digital signals for a first specific time period. Pelaez Ferrigno further teaches detecting whether noise is present in the frequency domain conversion of the digital signals for a first specific time period (i.e. a frame or a sampling period or a window) [Fig. 1].

Regarding claim 2, Pelaez Ferrigno teaches the method wherein detecting whether noise is present comprises: comparing the amplitudes of sounds in the frequency domain conversion of the digital signals; and determining noise is present if the amplitudes does not cross a threshold [Fig. 1; col. 7, line 47 to col. 8, line 67].

Claims 9-10, 26 are essentially similar to claim 2 and are rejected for the reasons stated above.

Regarding claim 11, Pelaez Ferrigno teaches the method, , wherein the filter is a software filter (i.e. computer implemented) [col. 3, lines 23-31].

6. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Morii [US 6,205,421].

Regarding claim 1, Morii teaches a computer implemented method of enhancing sound quality for computer telephony systems shown in Fig. 4, comprising:

receiving digital signals including telephony sounds [Fig. 4, block 122; col. 1, lines 26-60; col. 4, lines 52-65; col. 6, lines 30-37];

performing time-to-frequency domain conversion on the digital signals [Fig. 4, block 123; col. 4, lines 9-12];

detecting whether noise is present in the frequency domain conversion of the digital signals [[Fig. 4, block 124; col. 11, line 64 to col. 12, line 10; col. 39, lines 42-55]; and

applying a filter to remove the noise if noise was detected in the frequency domain conversion of the digital signals [Fig. 4, block 128; col. 4, lines col. 1-35; col. 12, lines 5-10; Fig. 17, block 80].

7. Claims 1 and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Pastor et al [US 6,445,801 B1].

Regarding claim 25, Pastor et al teach a computer implemented method [col. 13, lines 40-65] of enhancing sound quality for computer telephony systems, comprising:

receiving digital signals including telephony sounds [Fig. 1, block 0; col. 1, lines 15-18; col. 4, lines 4-6; col. 13, lines 40-46];

performing time-to-frequency domain conversion on the digital signals [col. 2, line 48 to col. 3, line 24; col. 1, lines 46-61];

detecting whether noise is present in the frequency domain conversion of the digital signals for a first specific time period (i.e. in a particular frame) [Fig. 7; col. 13, line 4-11]; and

applying a filter to remove the noise if noise was detected in the frequency domain conversion of the digital signals [Fig. 1, block 4; col. 4, line 59 to col. 5, line 12].

Claim 1 is essentially similar to claim 25 and is rejected for the reasons stated above.

Claim Rejections - 35 USC § 103

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claims 12-13, 15-16, 18, 22, 27, 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pelaez Ferrigno [US 5,577,161] in view of Paludan-Mueller [US 20020118851 A1].

Regarding claim 12, Pelaez Ferrigno teaches a computer implemented method

of enhancing sound quality for computer telephony systems, comprising:

receiving digital signals including telephony sounds [Fig. 1; col. 2, lines 61-67; col. 1, lines 16-25; col. 1, lines 61-64; col. 2, lines 12-19];

performing time-to-frequency domain conversion on the digital signals [Fig. 1; col. 2, line 67 to col. 3, line 2; col. 4, lines 57-67; col.8, lines 36-46]; and

applying a filter to remove the noise if noise was detected in the frequency domain conversion of the digital signals [Fig. 1; col. 3, lines 8-17.; col. 3, line 23 to col. 8, line 35].

Although Pelaez Ferrigno teaches detecting noise based on a signal/non-signal decision in the frequency domain [Fig. 1; col. 3, lines 2-7]; he does not disclose details on how the filter detects noise in the frequency domain. So one of ordinary skill in the art would have been motivated to seek any known method suitable to detect noise in the frequency domain, such as, the method of Paludan-Mueller.

Paludan-Mueller teaches detecting whether noise is present in the frequency domain conversion of the digital signals [Para: 0017] by monitoring the amplitude distribution of sound events in each band and comparing the amplitudes of sounds in a first (i.e. current) band with the amplitude of sounds in a second (i.e. higher) band to detect whether noise is present depends on one of the three conditions; the amplitude of sounds in the current band is substantially same or smaller or greater than the

amplitude of sounds in the higher band by more than a predetermined threshold value [Figs. 1-10; Para: 10; 00140018-0019; 0027-0031; 0034-0041; claims 1-9].

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teachings of Paludan-Mueller with Pelaez Ferrigno in order to improve telephone reception by detecting noise using two or more frequency bands and reducing if noise is present [Paludan-Mueller; Para: 0007].

Claims 16, 22 are essentially similar to claim 12 and rejected for the reasons stated above.

Regarding claim 13, the limitations are shown above.

Regarding claim 15, Pelaez Ferrigno further teaches averaging a signal [col. 6, lines 15-22].

Claims 18 and 29 are essentially similar to claim 15 and are rejected for the reasons stated above.

Claim 27 is essentially similar to claim 12 except for computer code that performs all the steps of the method and a computer readable medium. Pelaez Ferrigno further

teaches a flow chart [Fig. 1] for implementing the method using a digital signal processor (DSP) and a computer readable medium (memory) [col. 3, lines 23-40].

Regarding claim 30, the limitations are shown above.

10. Claims 3-4, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pelaez Ferrigno as applied to claim 1 above, and further in view of Paludan-Mueller [US 20020118851 A1].

Regarding claim 3 , Pelaez Ferrigno does no teach expressly the method wherein detecting whether noise is present comprises: comparing the amplitudes of sounds in a first band to the amplitudes of sounds in a second band in the frequency domain conversion of the digital signals; and determining noise is present if the amplitudes of sounds in the first and second bands are substantially the same.

Although Pelaez Ferrigno teaches detecting noise based on a signal/non-signal decision in the frequency domain [Fig. 1; col. 3, lines 2-7]; he does not disclose details on how the filter detects noise in the frequency domain. So one of ordinary skill in the art would have been motivated to seek any known method suitable to detect noise in the frequency domain, such as, the method of Paludan-Mueller.

Paludan-Mueller teaches detecting whether noise is present in the frequency domain conversion of the digital signals [Para: 0017] by monitoring the amplitude distribution of sound events in each band and comparing the amplitudes of sounds in a first (i.e. current) band with the amplitude of sounds in a second (i.e. higher) band to detect whether noise is present depends on one of the three conditions; the amplitude of sounds in the current band is substantially same or smaller or greater than the amplitude of sounds in the higher band by more than a predetermined threshold value [Figs. 1-10; Para: 10; 00140018-0019; 0027-0031; 0034-0041; claims 1-9].

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teachings of Paludan-Mueller with Pelaez Ferrigno in order to improve telephone reception by detecting noise using two or more frequency bands and reducing if noise is present [Paludan-Mueller; Para: 0007].

Claims 4 and 8 are essentially similar to claim 3 and are rejected for the reasons stated above.

11. Claims 5, 14, 17, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Pelaez Ferrigno and Paludan-Mueller as applied to claims 4, 12, 16, 27 respectively above, and further in view of either Harris et al [4,255,620] or Fielder [US 5,752,225].

Regarding claim 5, the combination of Pelaez Ferrigno and Paludan-Mueller does not teach expressly the method, wherein the first band includes sounds less than 500 Hertz, the second band includes sounds from 500 to 1500 Hertz and the third band includes sounds greater than 1500 Hertz.

Harris et al teaches a basis for selecting these three sub-bands for detecting speech sounds. It has long been known that the prime intelligibility of human speech lies in the band from about 1000 to about 3000 Hz, and that human speech is naturally temporally divided into higher frequency components (the consonants) occurring in the range from about 1500 to about 3000 Hz and lower frequency components (vowels) occurring in the rang from about o to about 1500 Hz [col. 25-52]. The cross-over region at approximately 500 Hz is a potential distortion region [col. 10, lines 15-47]. Fig. 4F illustrates the time averaged spectrum of signals [Figs. 4E, 4F; col. 10, line 60 to col. 11, line 35].

Fielder teaches an empirical technique for allocating a whole band into sub-bands. Fig. 7 illustrates critical band spectra of the output noise and distortion. Allocation C is then the same as allocation B for frequencies in the upper part of the audio band above 1500 Hz. The dotted line shows the auditory masking curve for a 500 Hz tone [col. 3, line 50 to col. 4, line 43].

At the time of the invention, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to select the three sub-bands of Harris et al or Fielder, wherein the low band includes sounds less than 500 Hz, the middle band includes sounds from 500 to 1500 Hz, and the high band includes sound greater than 1500 Hz with the three sub-bands of Paludan-Mueller. The motivation for this selection of these subbands would have been to use the actual bandwidth occupied by human speech sound, and speed up detecting audio signals [Harris et al; col. 1, lines 11-16].

Claims 14, 17 and 28 are essentially similar to Claim 5, and are rejected for the reasons stated above apropos of claim 5.

12. Claims 31-32 rejected under 35 U.S.C. 103(a) as being unpatentable over Pelaez Ferrigno [US 5,577,161] in view of Bartkowiak [US 6,711,540 B1].

Regarding claim 31, Pelaez Ferrigno discloses a computer implemented method (using a digital signal processor) of enhancing sound quality for computer telephony systems shown in Fig. 1, comprising:

receiving digital signals including telephony sounds [Fig. 1; col. 2, lines 61-67; col. 1, lines 16-25; col. 1, lines 61-64; col. 2, lines 12-19];

performing time-to-frequency domain conversion on the digital signals [Fig. 1; col. 2, line 67 to col. 3, line 2; col. 4, lines 57-67; col.8, lines 36-46];

detecting whether noise is present in the frequency domain conversion of the digital signals [Fig. 1; col. 3, lines 2-7]; and

applying a filter to remove the noise if noise was detected in the frequency domain conversion of the digital signals [Fig. 1; col. 3, lines 8-17.; col. 3, line 23 to col. 8, line 35].

Although Pelaez Ferrigno teaches a noise reduction method and filter for telephone communications systems [col. 1, lines 16-19], he does not teach expressly detecting noise in the frequency domain conversion of inbound or outbound tones.

Bartkowiak teaches detecting noise in the frequency domain conversion of inbound or outbound tones [Fig. 2; col. 5, lines 4-20; col. 6, line 52 to col. 7, line 59].

At the time of the invention, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Bartkowiak with Pelaez Ferrigno in order to enable the digital signal processor of Pelaez Ferrigno to detect maintones in a noisy signal environment and thereby to selectively apply the noise reduction filter of Pelaez Ferrigno to remove the noise from the tone [Bartkowiak; col. 1, lines 50-53].

Regarding claim 32, the limitations are shown above.

13. Claims 23 –24 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Pelaez Ferrigno and Paludan-Mueller as applied to claim 22 above, and further in view of Bartkowiak [US 6,711,540 B1].

Regarding claim 23, the combination of Pelaez Ferrigno and Paludan-Mueller does not teach expressly using a low-pass filter or a high-pass filter to remove noise.

Bartkowiak teaches detecting noise in the frequency domain conversion of inbound or outbound tones and remove the noise when noise is detected [Fig. 2, element 208; col. 5, lines 4-20; col. 6, line 52 to col. 7, line 59].

At the time of the invention, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Bartkowiak with Pelaez Ferrigno in order to remove the noise when noise is detected [Bartkowiak; col. 1, lines 50-53].

Regarding claim 24, Bartkowiak teaches a signal averaging filter [Fig. 2; element 210].

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramnandan Singh whose telephone number is (571) 272-7529. The examiner can normally be reached on M-TH (8:00-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Fan Tsang can be reached on (571) 272-7547. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ramnandan Singh
Examiner
Art Unit 2646